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THE PROJECTED NEW BARGE CANAL OF THE STATE  
OF NEW YORK.

(MAP, p. 320.)

BY

COL. THOMAS W. SYMONS, U. S. ARMY.

In the years following the Revolutionary War the subject of navigable canals was a very absorbing one to our forefathers. In this new and rapidly-developing country in those pre-railroad days the importance of canals in the transportation world can hardly be appreciated at the present time. Canals were projected all over the country, and many were built. The attention and labours of the ablest men of the period were devoted to canal schemes, their financing, locating, and building.

A good many of the canals that were built have succumbed to new conditions and been discontinued, being unable to stand the competition of railroads. Some, however, have stood the test of time, and have remained important factors in the commercial world to the present day. Without question the most important of these early artificial waterways was the Erie Canal through the State of New York, connecting the Hudson River with Lake Erie. This canal, although originally built of small size, played a very important part in the settlement of the great West, or what was then the great West, by furnishing a route in connection with the Great Lakes by which the products of the new Western country could reach the markets along the seaboard, and by which in turn it could get its supplies of clothing, tools, groceries, &c., at an economical rate for transportation. It is certain that the settlement and development of the New York and New England Hinterland were enormously expedited by the Erie Canal.

Locally in New York State the effect of this canal was shown by the increasing commercial importance of New York City and the establishment and development along the line of the canal of the most important chain of cities in the country—Albany, Troy, Cohoes, Schenectady, Little Falls, Utica, Rome, Syracuse, Rochester, Lockport, and Buffalo.

Some of the early New York canals have been abandoned. Those which are left and kept in a navigable condition are: the Erie Canal, connecting the upper chain of Great Lakes above Niagara Falls with the Hudson River, and thence with the seaboard; the Oswego Canal, which connects Lake Ontario with the Erie Canal; and the Champlain Canal, which connects Lake Champlain with the navigable water of the Hudson. The Erie Canal, which is the principal member of this canal trinity, is 350 miles long, and at present has 72 locks. It was originally built with a depth of four feet, with locks 90 x 15 feet, being of a size to accommodate boats of but 80 tons capacity, and was completed in 1825. Tolls on the canal were high at first, but were gradually reduced, and for many years have been abolished altogether.

It is a noteworthy fact that before they were finally abolished the tolls had more than paid for the canals of the State and their enlargement.

The small 80-ton canal was soon found inadequate, and it was enlarged to its present capacity—that is, for boats carrying 240 tons of freight. This work of enlargement was started in 1835, but was not completed until 1862.

When the canal was built, and when it was enlarged, the only known or successfully-developed method of canal-boat propulsion was by animal towing, and a tow-path was provided all along the canals. The necessity for this tow-path was one of the principal factors which caused the canal to be kept out of water courses and built in the upper portions of valleys. The development of steam canal-boat propulsion has changed the problem, and the great canal that New York is to build will now be located, wherever possible, in streams and lakes, and it will have no tow-path. This will reduce the cost of maintenance enormously, for the cost of keeping the tow-path in order is the heaviest item of expense of the present canal.

The New York canals were no sooner enlarged to their present size than agitation for their further improvement commenced. This culminated, about ten years ago, in the adoption of a project for deepening the canals so that they would accommodate boats of

eight feet draft instead of six feet, and for lengthening the locks so that they would take two boats of the same length and width as at present, coupled tandem, at one lockage. The State made an appropriation of \$9,000,000 to carry this project into effect. It was soon found, however, that the amount named was grossly inadequate, and that to complete the project would cost two to three times the sum which had been voted. The work was also badly managed, and the people of the State were indignant at the deception which had been practiced on them regarding the estimates and the scandals attending the work, and the project was abandoned. Then came another period of agitation, investigation, and discussion. All sorts of things were proposed. Many prominent people wanted a ship canal connecting the Great Lakes with the sea, and several routes were surveyed, and estimates of cost of various-sized canals made. Many wanted the \$9,000,000 project completed, either as originally proposed or with modifications. Some wanted to turn the State canals over to the General Government, and depend on it for maintenance and improvement. Some wanted to abandon the canals altogether, and some to utilize the canal right of way for State railroads.

In 1897 the writer of this paper, in a report to the General Government, proposed, as the best solution of the problem, that the canals should be enlarged to enable them to be used by barges carrying 1,000 to 1,500 tons. Governor (now President) Roosevelt, appointed a Board of prominent New York business men soon after this to advise the State what to do with its canals, and this Board, after more than a year of investigation, and the careful consideration of everything that could be proposed, reported in favour of enlarging the Erie Canal to a capacity for barges of 1,000 tons, and a lesser improvement for the Oswego and Champlain Canals. The Legislature caused surveys, plans, and estimates for the work to be made. All the canal people of the State finally came in under the banner of the 1,000-ton barge canal, and through their united efforts the Legislature at last passed a bill for the enlargement of the Erie, Oswego, and Champlain Canals, to enable them to be used by 1,000-ton barges, with all the locks of sufficient size to take two boats, coupled tandem, at one lockage.

The estimated cost of the work proposed was \$101,000,000. At the fall election of 1902 this proposition was submitted to the people of the State, who approved it by a majority of about 250,000 votes.

New York is thus committed to and has entered upon this

tremendous work of canal improvement—by far the greatest work ever undertaken by any State.

This projected work is in the very front rank of canal propositions. It is overshadowed in the public mind by the Panama Canal, on account of the international character and the interesting complications that have attended the inauguration of that work by the United States. In commercial importance the Erie is in many ways the equal of the Panama Canal. On the Panama it is hoped to some time reach a tonnage of 10,000,000; on the Erie all works, structures, water supply, &c., are predicated on a tonnage of 10,000,000, and provisions are made for accommodating, at slight additional expense, a tonnage greatly in excess of this. On the upper Great Lakes there is a water-borne commerce of very nearly 90,000,000 tons per year. The Erie Canal will furnish the cheapest route for connecting this vast lake commerce with the seaboard, and its wide-reaching influence can hardly be conceived or appreciated except by those who have given years of study to the problem.

In magnitude the work that New York has undertaken exceeds the work at Panama. More earth and rock must be excavated, more masonry used, and more dams built. The cost per unit is not nearly so high as at Panama, because the work will be done in the temperate zone, where labour, tools, and materials are abundant and reasonably cheap.

In the complexity of the engineering questions involved the Erie is hardly second to the Panama Canal; for, while the canalization of the Mohawk River is a very different problem from the control and utilization of the Chagres River, they are both engineering projects of the very first magnitude.

The building of the Panama Canal under conditions akin to the proposed enlargement of the Erie Barge Canal would be a simpler, cheaper, and easier work than that which New York has undertaken.

#### THE PROJECTED BARGE CANALS.

The barge canals that New York is to build will follow the same general route, fulfill the same functions, and minister to the same wants as the present navigable canals connecting Lakes Erie, Ontario, and Champlain with the navigable waters of the Hudson below Troy.

In three important respects they will differ from the existing canals: first, as to size and capacity; second, as to location; and third, as to the character of navigation provided for.

## SIZE.

The locks of the new canals which govern the dimensions of the boats that can be used are 28 feet wide, 310 feet long, and 11 feet deep. The canal prism has a depth of 12 feet and a general minimum width on the bottom of 75 feet in canal sections and 200 feet in rivers, pools, and lakes. Boats can be built which will pass through the canal carrying 1,000 tons of freight, but it will probably be found advantageous to sacrifice some of the carrying capacity to secure better models and greater clearance. The lift of the locks will be much greater than at present, and the number of locks will be greatly reduced. On the present Erie Canal there are 72 locks; on the new Erie Barge Canal there will be but 38 locks.

The new locks will take two canal boats, each of 150 feet length, coupled tandem, at one lockage; and this makes the lock capacity 2,000 tons, or about eight times that of the present canal. As freight boats nearly always travel in pairs coupled tandem, the advantage of the double-length locks in doing away with the necessity of uncoupling and recoupling at every lock is very great, saving much time and lessening dangers.

## LOCATION.

A very decided change is made in the location of the canals. The Erie Canal is about 350 miles long, and the new canal follows the old canal for only about 100 miles; the other 250 miles is almost entirely by a new route. Large portions of the Champlain and Oswego Canals also follow new locations.

The existing canals may be called "hill-side" canals, as they go through the open country and along the upper portions of valleys above the rivers, from which they religiously keep away to the greatest extent possible. The new and greater canal is put in the valley bottoms and in the water-courses and lakes wherever practicable.

The principal advantage of the valley bottom location in the case of the greater canal are cheapness of construction, greater freedom and ease of movement by boats in the wider waters of the water-courses and lakes, greater rapidity and less cost of transportation, greater immunity from accidents that disable the canal, and less cost of maintenance. With the small canal as originally built and as subsequently enlarged to its present size it would not have been economical, with the knowledge and means then possessed, to have built the dams and locks required to canalize the Mohawk and other rivers and to excavate the large channels

required for flood-discharge. With the large barge canals now proposed this canalization is not only desirable but is cheaper than it would be to utilize the existing lines of the canals.

#### NAVIGATION.

The present existing canal is a "tow-path" canal, built with the distinct idea that all business on it should be done by animal towing.

In the new and larger canal no tow-path is provided, and it is expected that navigation through it will be by means of steamboats properly adapted to it and towing other motorless cargo boats, in accordance with the custom which has been developed and is now in vogue on the Erie Canal, to a certain extent. It is this change in the method of navigation which permits the valley bottom, lake, and water-course location to be adopted.

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Long years before the construction of the Erie Canal the early pioneers had found a watery highway extending nearly across the State of New York, and it was largely used by those who settled the western portion of the State. It was not perfect, involving, as it did, many portages about falls and rapids and from one river to another, and the stemming of swift river currents, with bars and shoals, but it fulfilled a most useful function.

The Erie Canal when built did not follow this pioneer route for reasons stated; but it is a remarkable circumstance that now, after nearly a century of disuse, this old pioneer route is to be again adopted and the new and larger barge canal is to follow it without material deviation. This old pioneer route followed up the Mohawk River, with portages about the falls and bad rapids to the vicinity of Rome; thence a portage was made across to the waters of Wood Creek; thence it followed down the waters of this small stream to Oneida Lake. On across the lake it went and down the Oneida River to the junction of the Oneida, Oswego, and Seneca Rivers at Three River Point—a famous locality in the olden days. Here two routes were open to the enterprising traveller. If he were going to the settled western part of the State he would follow up the Seneca River and thence into the various branches and into the beautiful "finger" lakes tributary to the Seneca. At that time and by that route the cost of transportation between Albany and Seneca Lake was from \$75 to \$100 per ton, and it took four weeks to make the round trip. If he were going farther west, or into Canada, or had much freight to transport, he would oftentimes

go on down the Oswego River to Lake Ontario and thence by lake to his destination.

The projected route of the Erie Barge Canal follows up the Hudson River to Waterford. Thence, by means of the requisite locks, it reaches the Mohawk River above Cohoes Falls. From Cohoes Falls to just west of Rome the river is canalized—that is, dams are built, forming great pools, and these pools are connected by channels not less than 200 feet in width and 12 feet in depth. Above Rome there is a summit level leading over to Wood Creek, and, as in the olden days, the canal route follows down this stream and through Oneida Lake and Oneida River to Three River Point, thence up the Seneca River properly canalized to the vicinity of Clyde. From Clyde westward there are no water-courses of importance running in the right direction, and the new canal will follow generally the route of the existing canal to the Niagara River at Tonawanda. Thence the Niagara River will be used up to Lake Erie and Buffalo. Between Clyde and Tonawanda there is one important modification of the route, and this is at Rochester. The present canal goes through the city in a very awkward manner, crossing the Genesee River in a masonry aqueduct, and the route is impracticable for the large canal. Here a new route is adopted, passing to the south of the city and crossing the Genesee River in a pool formed by damming the river.

The Oswego Barge Canal leaves the Erie Canal at Three River Point and keeps on down in canalized Oswego River to Lake Ontario.

The new Champlain Canal keeps in the Hudson River from Waterford to Fort Edward, instead of following along on the bank of the river as at present. In doing this, advantage is taken of the commercial power dams which already exist in the river, and which, in connection with locks to pass them and the deepening of the river between the pools, will fully canalize the river. From Fort Edward to Whitehall, at the foot of Lake Champlain, the new canal follows the location of the existing one.

#### WATER SUPPLY.

The most important question connected with any canal proposition is that of water supply, and the Erie Canal is no exception. The western end of the canal will be fed from Lake Erie, as at present, the existing canal from Lake Erie to Tonawanda being retained as a water-feeder only. This, with natural local supplies from streams along the line, will give all the water required until



the Seneca River is reached, which has an abundance of water. The only locality where the water-supply problem attains great importance is at the summit level, between the Mohawk River and Oneida Lake. This is provided for, for the larger canal, by utilizing the existing sources of supply and developing additional ones by water storage in West Canada Creek, the Mohawk River, and Oriskany Creek.

If in the future more water is needed, due to increased use of the canal, or for any other reason, this can be supplied by additional storage in the Adirondacks at a comparatively small expense.

It is believed that these new and enlarged canals will be of benefit to New York in enabling her to retain and increase her commercial supremacy, largely through their controlling influence on freight rates and the prevention of differential discrimination against the port of New York, which is now and has for years been the rule.

They will also benefit the entire region of the Great Lakes, and this benefit will extend far into the interior of the Great Northwest and influence transportation rates throughout the country.

Upon the Great Lakes many millions of tons of freight are transported every year at exceedingly low rates—far lower than are possible by any other than water transportation. The canals that New York has undertaken to build will practically extend this cheap system of water transportation to the seaport of New York and other ports in the vicinity, and bind the East and West closer together.

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#### THE NEW STIELER'S HANDATLAS.\*

Gotha was the undisputed centre of geographic science for a considerable period of the 19th century, beginning with the year 1854, when August Petermann became connected with the firm of Justus Perthes. Thus the new issue of Stieler's Handatlas, which approaches completion, may be regarded as a jubilee celebration. This idea leads Dr. Hermann Wagner, in the January number of Petermanns Mitteilungen, to discuss the history of that atlas and, incidentally, to sketch the development of cartography, as applied to atlas-making, during the 19th century.

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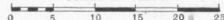
\* An Abstract of Dr. H. Wagner's paper in Petermanns Mitteilungen, Band 50, Heft 1.

# ROUTE OF THE BARGE CANAL TO BE BUILT ACROSS THE STATE OF NEW YORK

Based on the Map of  
Edward A. Bond, State Engineer and Surveyor.

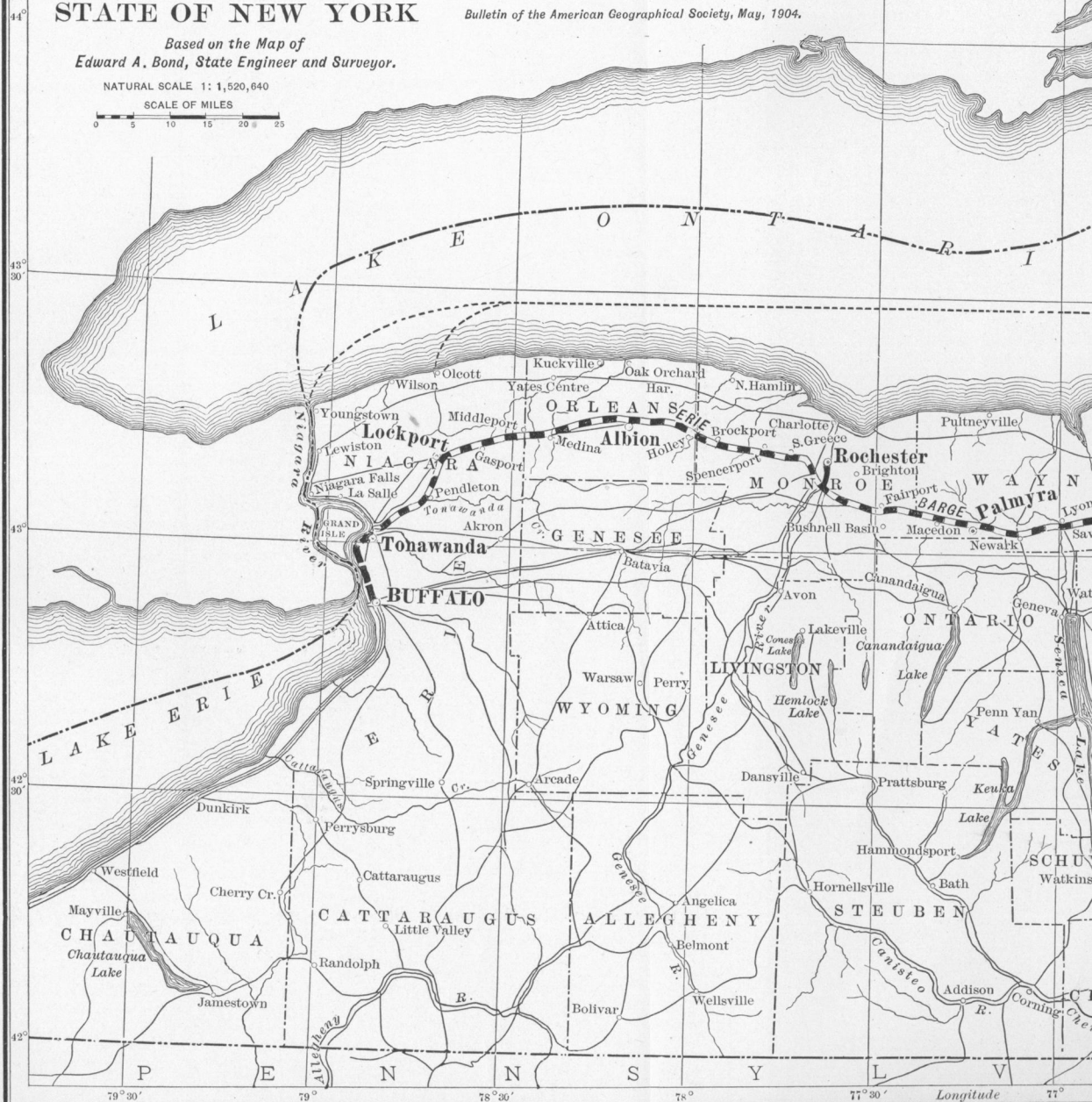
NATURAL SCALE 1: 1,520,640

SCALE OF MILES



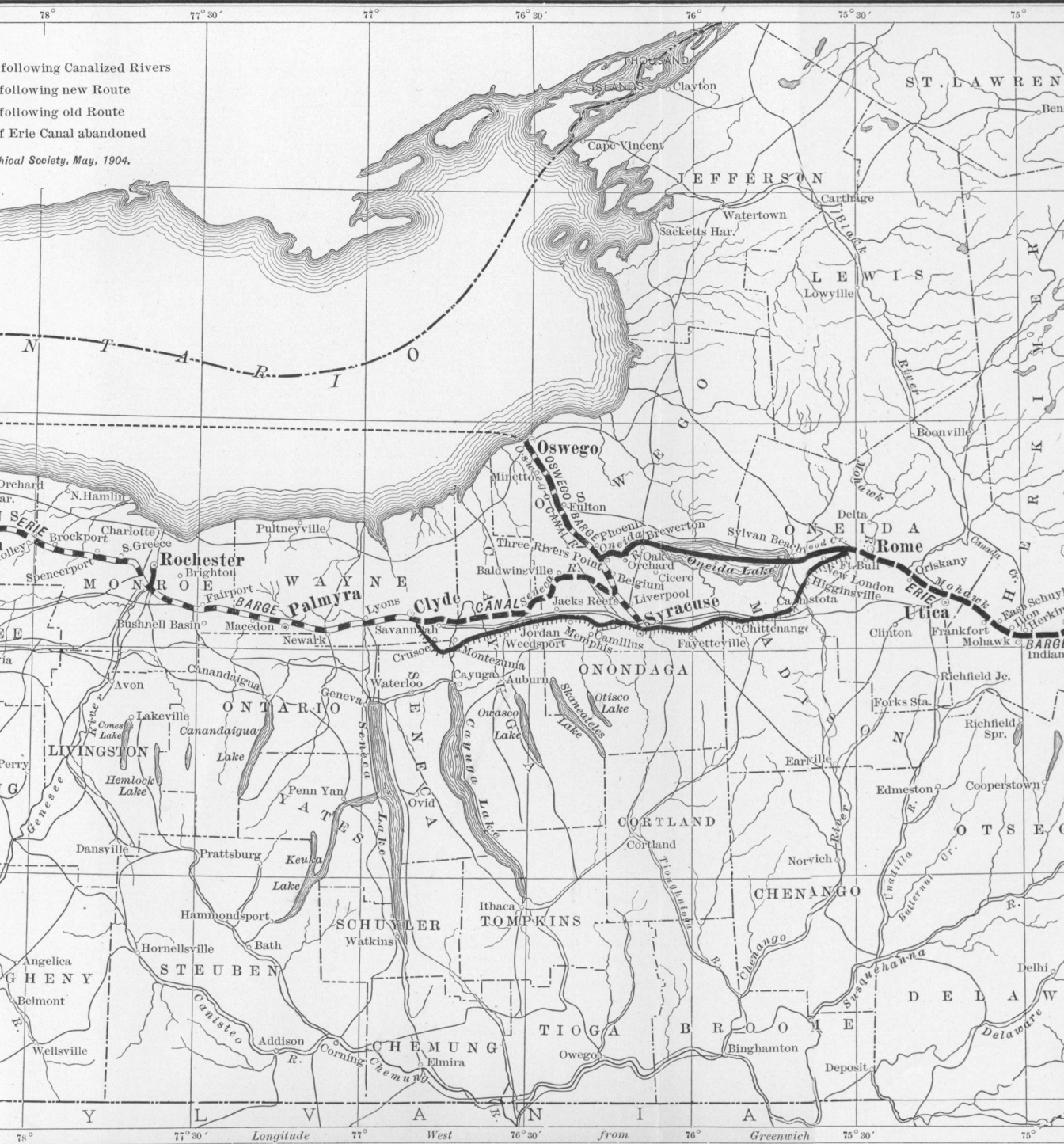
- Canal following Canalized Rivers
- Canal following new Route
- - - - - Canal following old Route
- ||||| Part of Erie Canal abandoned

Bulletin of the American Geographical Society, May, 1904.



following Canalized Rivers  
 following new Route  
 following old Route  
 of Erie Canal abandoned

ical Society, May, 1904.



Longitude

West

from

Greenwich

